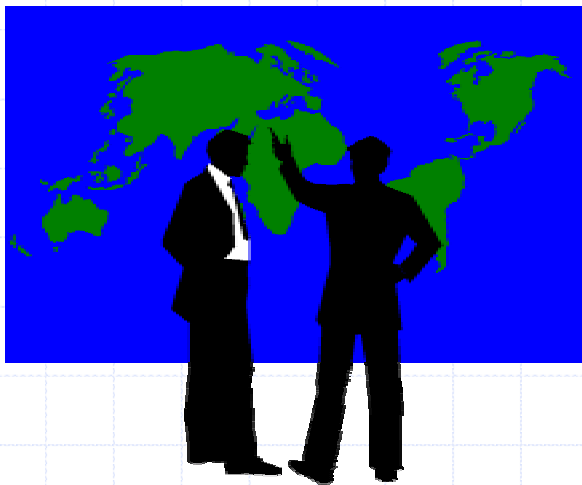




U.S. Department of Energy

OAK RIDGE NATIONAL LABORATORY

CHP Subcontractors Coordination Review Meeting



April 22, 2004
Oak Ridge National Laboratory's
Washington D.C. Office

Name of Contract and Subcontractors

A Review Of Distributed Generation Siting Procedures



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Description of Task(s)

- Objectives

- Evaluate the distributed generation siting process, and identify ways to improve the processes that could result in reductions in cost and time
- Help developers understand siting and permitting costs and siting project duration

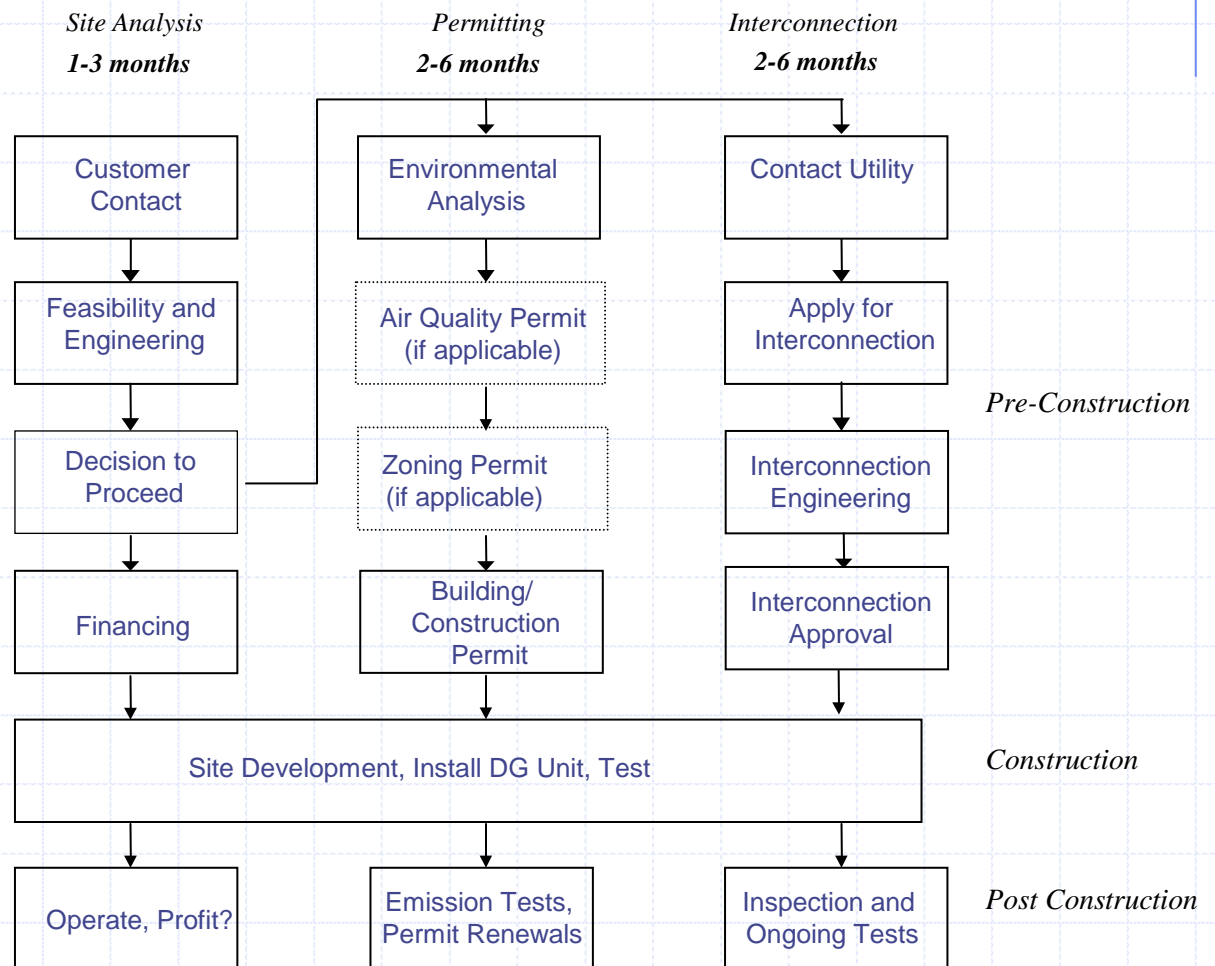
- Approach

- Task 1. Collect baseline siting data
- Task 2. Perform siting trends analyses
- Task 3. Analyze siting procedures and make recommendations

Description of Progress Against Task(s)

Task 1: Collect Baseline Siting Data

- Developers are surprised during first few projects at how long it takes.
- Under expedited or simplified processes may be possible to reduce duration to 4 months.



Description of Progress Against Task(s)

Key Data Source: DG Project Developers or ISPs

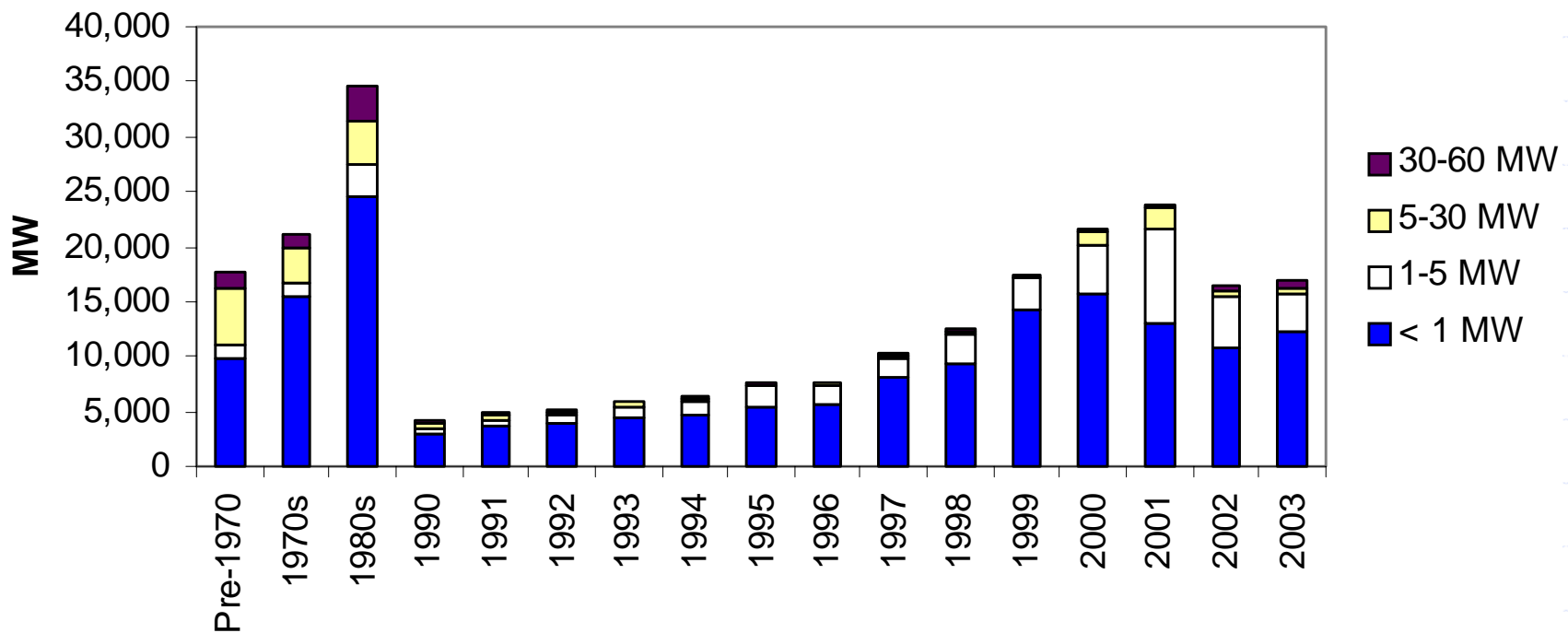
- Integrated Solution Providers (ISPs) provide turnkey DG siting service: develop DG solution, select best technology, obtain permits, achieve interconnection, oversee installation.
- ISPs gain siting experience and learn how to navigate all DG siting processes, potentially reducing siting time and costs.

Integrated Solution Provider	State	Business Products
Constellation NewEnergy	CA	DG, fixed price electricity, energy tracking software
Catalyst Power Partners	CA	Turnkey DG solutions
RealEnergy	CA	DG and CHP
AmerEsco	MA	DG and CHP
NorEsco	MA	Turnkey DG and CHP
DTE Energy Services	MI	Turnkey DG and CHP
Coast Intelligen	NY	CHP for small to medium size entities
Celerity Energy	OR	DG, energy networking software
Northern Power Systems	VT	Turnkey DG solutions

Description of Progress Against Task(s)

Task 2: Siting Since 2001 Has Been Slowing

Capacity of DG Installed by Year by Size



Sources: EIA 860, Current Industrial Reports, *Diesel and Gas Turbine Worldwide*, RDC.

Description of Progress Against Task(s)

DG Continues to Be Sited

Capacity Installed 2000-2003 by Technology and Size (MW)

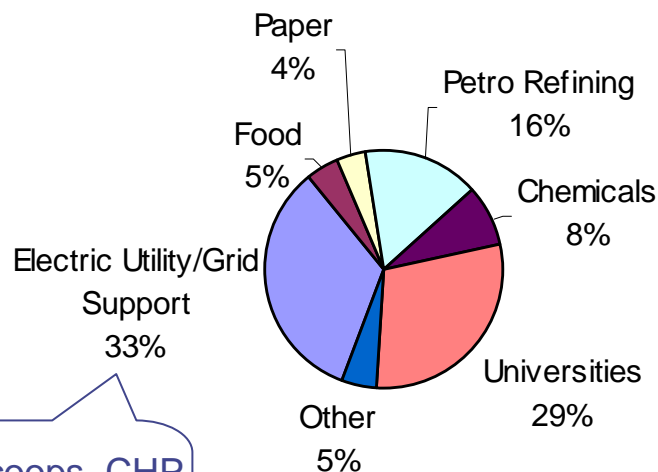
Size Category	< 1 MW	1-5 MW	5-30 MW	30-60 MW	All Sizes
Combined Cycle		5	20	40	60
Combustion Turbine	70	70	3,990	1,560	5,690
Fuel Cell	50				50
Hydropower		4			4
Reciprocating Engine	51,700	20,770	330	40	72,880
Steam Turbine		30	70	50	150
Total MW Capacity	51,860	20,880	4,410	1,680	78,820

Sources: EIA 860, Current Industrial Reports, *Diesel and Gas Turbine Worldwide*, RDC.

Description of Progress Against Task(s)

Small Units Are Applied in a Wide Variety of Sectors

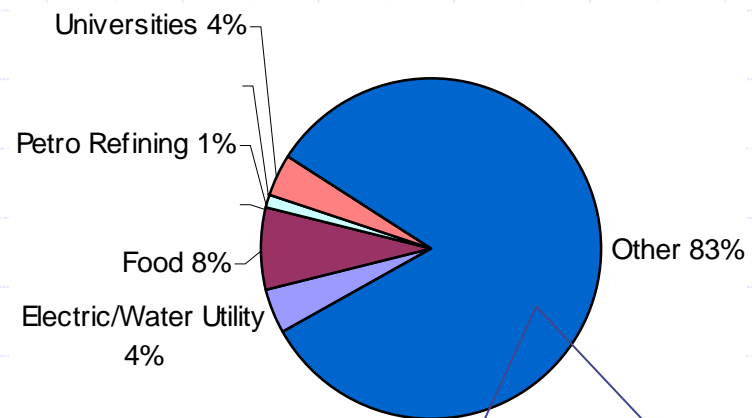
**% Capacity Interconnected 2000-2003
Units > 1 MW**



Munis, coops, CHP
sales of excess
to grid

Sources: EIA 860, *Diesel and Gas Turbine Worldwide*.

**% California Capacity Interconnected
2000-2003, Units < 1 MW**



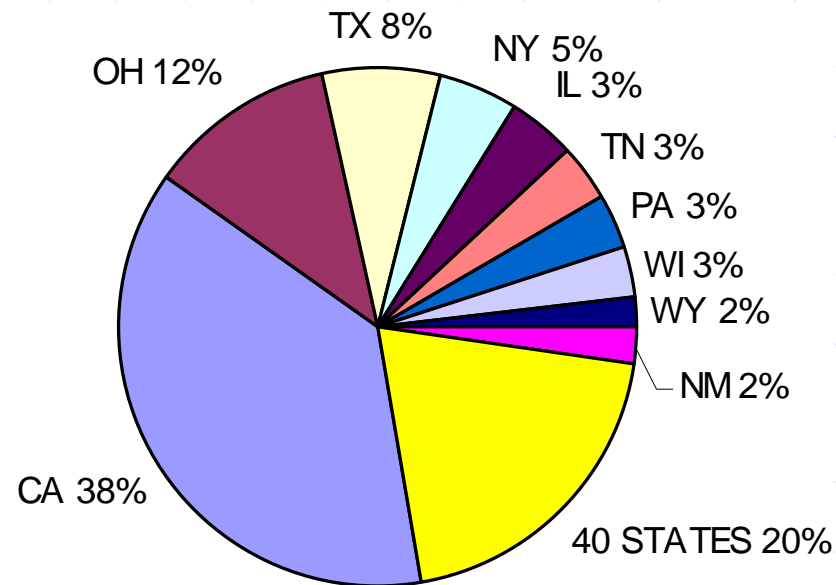
Residences, apartments, hospitals,
government buildings, casinos, data
centers, hotels, farms, churches, military
bases, nurseries, health fitness clubs

Source: California Rule 21.

Description of Progress Against Task(s)

Over Three-Fifths in Just 4 States

Percent of Capacity Interconnected 2000-2003 by State, Units > 1 MW

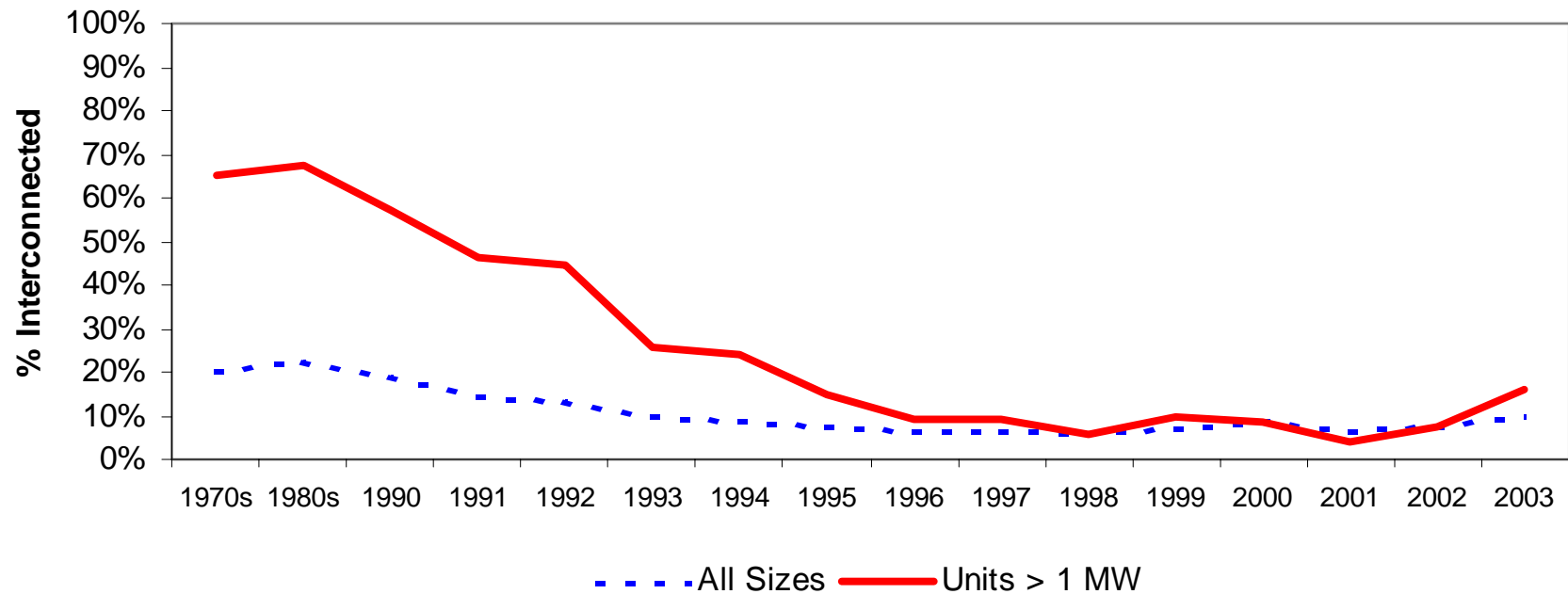


Sources: EIA 860, *Diesel and Gas Turbine Worldwide*.

Description of Progress Against Task(s)

High Costs May be Inhibiting Interconnection

Percent of DG Capacity Interconnected over Time



Sources: EIA 860, Current Industrial Reports, *Diesel and Gas Turbine Worldwide*, RDC.

Description of Progress Against Task(s)

Siting Costs

- Siting costs add 8-50% or more to equipment cost. Cost varies by unit size, technology and specific location (not region).
- Site analysis and engineering is unique, is the most expensive track, and can cost millions for larger units.
- Permitting typically costs \$5,000 - \$60,000. Largest cost can be air emissions control equipment. Expedited fees for small units can be as little as \$100.
- Interconnection typically costs \$20,000 - \$30,000, but may reach \$300,000 plus \$10,000 in annual utility fees. Burdensome for smaller units.
- Anecdotal data does not give comprehensive picture.

Description of Progress Against Task(s)

Composite Draft Siting Costs

Siting Cost (\$ per kW) by Track, Technology and Unit Size

Size (MW)	< 1 MW	1-5 MW	5-30 MW	30-60 MW
Technology				
Track 1: Site Analysis and Engineering – Typically \$5,000 to \$2,000,000				
Reciprocating Engine	40-130	80-100	195-270	
Microturbine	50-150			
Combustion Turbine		50-70	55-90	35-60
Fuel Cell	25-65			
Track 2: Permitting – Typically \$5,000 to \$60,000				
Reciprocating Engine	60-95	6-11	2-4	
Microturbine	80-125			
Combustion Turbine		6-11	2-4	1-2
Fuel Cell	25-40			
Track 3: Interconnection – Typically \$8,000 to \$300,000				
Reciprocating Engine	100-125	6-17	3-9	
Microturbine	130-170			
Combustion Turbine		6-17	3-9	3-7
Fuel Cell	40-50			

Most expensive track

Expensive for smaller units

Source: Composite of all data sources.

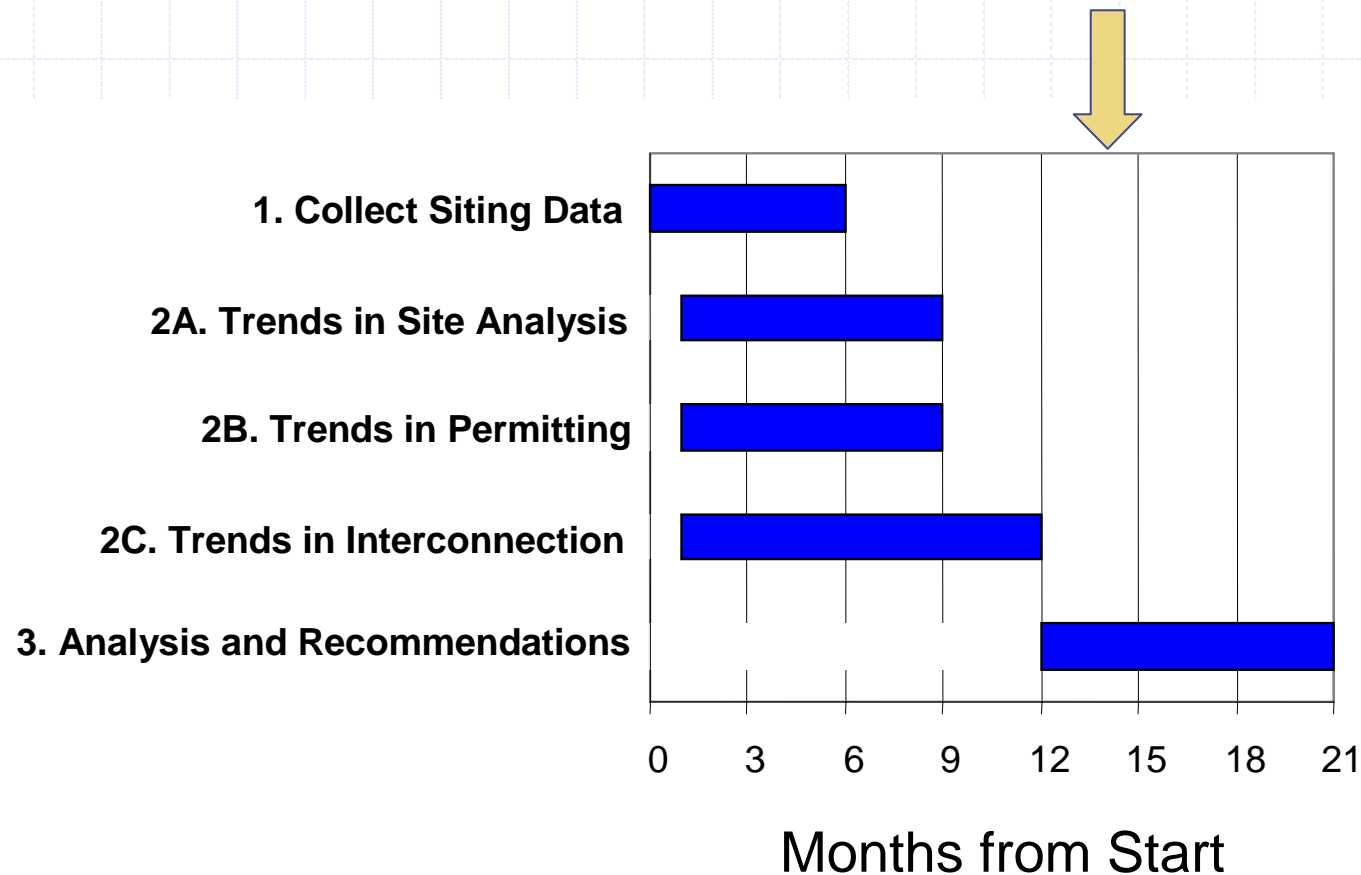
Description of Progress Against Task(s)

Task 3. Analyze Siting Procedures & Make Recommendations

- Examine ways to mitigate siting and permitting costs.
- Carefully examine what has and is happening in the leading states
 - Those that have adopted DG interconnection and siting rules, or have large siting levels
 - Includes NY, TX, CA
 - May include IL, NJ, OH, MA, WI, MI
- Consider requesting EIA 412 unregulated entity Schedule 9 data.
- Prepare draft report.
- Conduct external reviews of draft report, especially by DG developers.

FY04-05 Timeline

April 2004



FY03 Deliverables and Availability

<u>Deliverable</u>	<u>Status</u>
Task 1 Status Report	Completed
Task 1 Draft Report	Completed
Task 2 Status Report	Completed
Task 2 Draft Report	Completed
Task 3 Status Report	Planned for June 04
Task 3 Draft Report	Planned for July 04
Draft/Final Report/PPT	Planned for Sept 04

- All deliverables will be available in PDF format for both hard copy and electronic delivery

Coordination with Stakeholder Groups and Other Project Teams

- Stakeholders Key Part of Project Inputs
- Other Stakeholder Interactions being Considered

Questions?

